

LISTS OF SPECIES

Orchidaceae, Chotanagpur, state of Jharkhand, India.

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Abstract: Orchids display a diversified range in terms of shape, size and colour of flowers. They have a unique floral morphology compared to other angiospermic plants. They have minute seeds that are dispersed through air, and that may be why they are distributed throughout the world, except for the hot deserts and Antarctica. Though the family Orchidaceae represents a highly advanced group of plants, they are highly susceptible to even slight changes in environmental conditions. In India, orchids are represented by 1,141 species belonging to 186 genera. The present study was conducted on the Chotanagpur region of India, most of the part of which lies in the state of Jharkhand. A systematic survey was conducted through out the state from April 2002, on foot in different forested regions in different seasons. A checklist of 63 species of orchids recorded from this area is provided. That includes 26 new records.

Introduction

Orchids are the second largest group of flowering plants comprising about 788 genera and 18,500 species (Mabberley 1997). They are distributed throughout the world, except the hot deserts and Antarctica. In India, they are represented by 186 genera and 1,141 species (Kumar and Manilal 1994). They have been attracting botanists, naturalists, and ecologists since the time immemorial due to their incredible range of diversity in shape, size, and colour of flowers. This highly advanced family of monocots is comprised mostly of herbaceous plants, characterized by distinct floral morphology, pollination mechanism, association with unique fungal partners (mycorrhizae) and miniscule seeds. Based on their varying habits, orchids are classified into saprophytic (growing on dead and decaying matter), terrestrials (growing on ground), epiphytic (growing on trees or shrubs) and lithophytic (growing on rocks).

Although being one of the most advanced groups of plants among angiosperms, orchids are highly susceptible to even slight changes in the environmental conditions. As orchid seeds are very small and light, they are dispersed by wind. If they fall into some new environmental condition, they either die or try to tolerate or even bring about some genotypic change to adapt to the new environment. This is one of the reasons why orchids are such a big group and the number of new species is always increasing, and simultaneously many orchid species are becoming extinct day by day.

The history of orchid study in India starts from Lindley (1857, 1858). Then, Hooker (1888 -1890) came out with a legendary work on the Flora of British India, which included information on the Orchidaceae of India, and later he published a book exclusively on Indian orchids (Hooker 1895). This was followed by King and Pantling (1898) on orchids of Sikkim Himalayas, and by Duthie (1906) on orchids of NW Himalayas.

In the recent years, comprehensive accounts have been published for various states and regions of India (e.g. Meghalaya, Kataki 1986; NW Himalayas, Deva and Naithani 1986; Nilgiris, Joseph 1987; Kerala, Kumar and Sashidharan 1987; Manipur, Ghatak and Devi 1986; Mizoram, Singh et al. 1990; Sikkim, Bruhl 1993; Arunachal Pradesh, Chowdhery 1998; Nagaland, Hynniewta et al. 2000; and Orissa, Mishra 2003).

In the state of Jharkhand, however, no comprehensive study on orchids has been carried out so far. General collections on plants and orchids are mentioned by Prain (1903), Duthie (1920), Haines (1921–1924), Raizada (1975), Mooney (1950), Ghosh (1971), Das (1996), and Sharma and Sarkar (2002). Recently, an analytical work on the flora of Bihar (which includes plants of the new state of Jharkhand), based on earlier surveys and collections, has been done by Singh et al. (2001). All these works give a brief idea about the occurrence, number, location and phenology of orchids of this region. These orchids

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are facing a great threat from the anthropogenic factors and change in environmental conditions, and hence their conservation is necessary (Kumar et al. 2005). The present work gives an updated list of orchids found in this area.

Materials and methods

Study area

Jharkhand, locally meaning the "*land of forests and*

scrubs" is a new state of India, and was carved out of the state of Bihar (Figure 1). The state has a number of hills, valleys, and plateaus of Chotanagpur Range. Clarke (1898) suggested that the hills of Parasnath Hills (which forms the highest peak in the Chotanagpur region) may have served in the past as stepping stone for the passage of plant species between the hills of Peninsular India and eastern Himalayas.

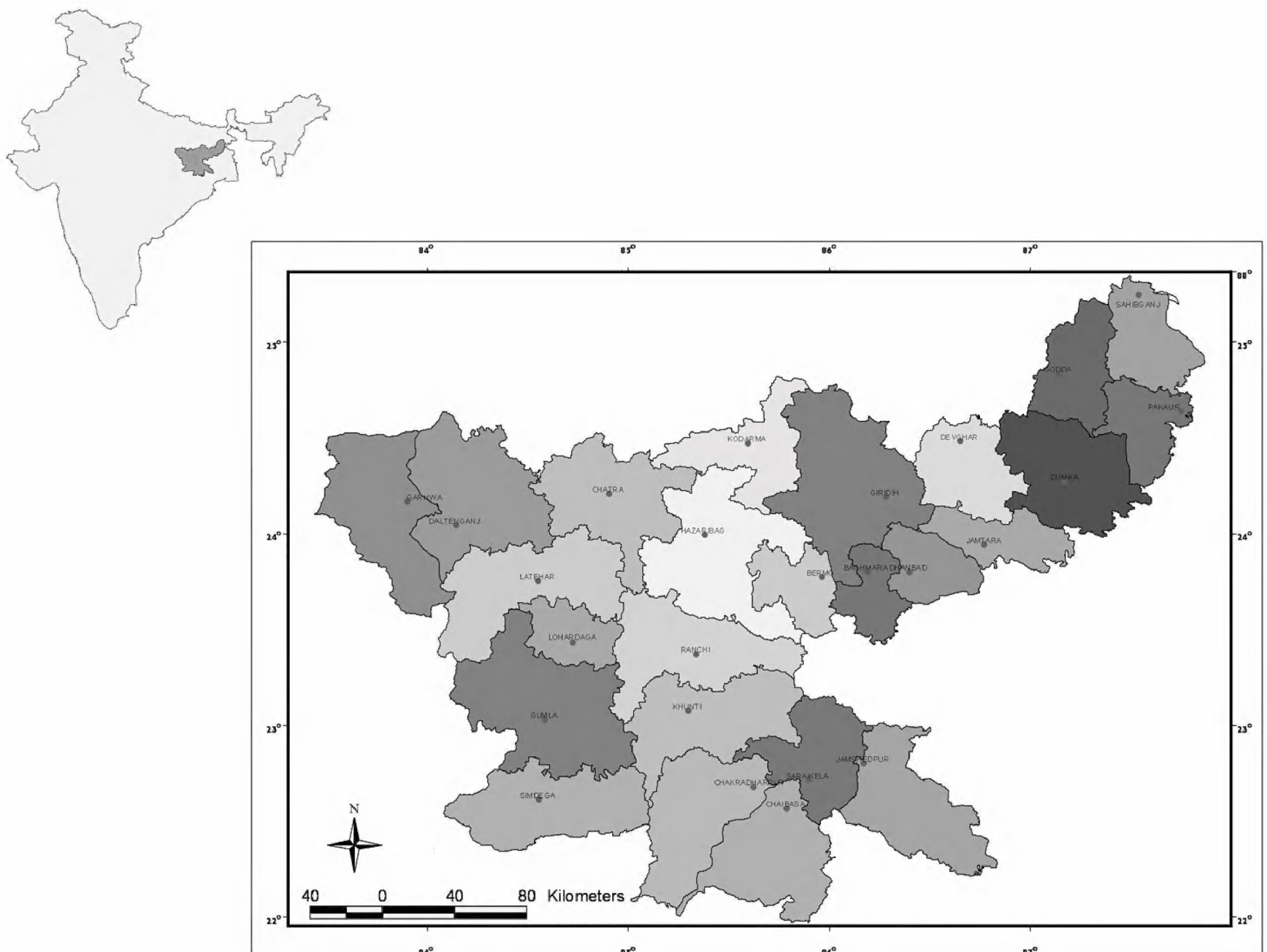


Figure 1. Map of India showing the location of the state of Jharkhand.

With respect to orchids, the study area of Jharkhand lies in the centre of 3 major orchid hotspots of India, namely the eastern Ghats, western Himalayas, and eastern Himalayas. Chotanagpur is one of the biogeographic microcentres on which the state of Jharkhand lies. It lies in Deccan province in the Indian Region of Paleotropic Kingdom (Takhtajan 1986).

Although this region is not so rich in orchid populations, even though orchid seeds are dispersed by air, the region is important in the sense that it may be acting as a port for dispersal of orchids in the adjacent areas. Moreover, no such comprehensive studies on orchids have been made in this area in the past.

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Data collection

Extensive filed surveys were conducted throughout the forested regions of the state, which were traversed on foot since august 2002 in different seasons. Stress was made to study plants in their flowering condition so as to identify them properly. Standard methods for collection and preservation were used following Jain and Rao (1977).

Flowers were preserved in alcohol and were studied under compound microscope for detailed morphology.

Herbariums and libraries within India at Central National Herbarium, Howrah (CAL); Department of Botany, T. M. Bhagalpur University, Bhagalpur (BHAG); Forest Research Institute, Dehradun (DD); Wildlife Institute of India, Dehradun, and Botanical Survey of India, Dehradun (BSD), were consulted for identification. Experts on orchids from different institutes in India were also consulted regarding the identification.

Accepted names are provided in boldfaced and basionyms in italicized font. The list is arranged according to the classification given by Szlachetko (1995). Citation of author names follows Brummitt and Powell (1992). Habit for

each species is provided in square brackets. Care was taken, not to disturb rare orchid populations and hence most of the voucher specimens are in form of pictures and herbarium sheets which were deposited at Wildlife Institute of India, Dehradun (WII). Moreover, live specimens are being maintained at the green house at the Institute's and at the first author's garden. Provision of single voucher number also intends to inform that the particular species was very rare in the study area.

Results and discussion

A total of 63 species of orchids were recorded from the state of Jharkhand, the list of which is provided below along with their basionyms. Out of these, 33 species are terrestrial, including 1 lithophytic and 1 semi-aquatic species, whereas 29 species are epiphytic, of which 5 were also found to be lithophytes. One species was only found in lithophytic condition.

Species like *Goodyera procera* (Ker Gawl.) Hook., *Phaius tankervilleae* (Banks ex L'Hér.) Blume, and *Pecteilis susannae* (L.) Raf., that were reported in earlier studies by Haines (1921-24) and Ghosh (1971), could not be found during the current survey. This may imply that these orchids are loosing their natural habitat and becoming locally extinct.

Checklist of orchids of Jharkhand:

Family **Orchidaceae**

Subfamily **Orchidoideae**

Tribe **Orchideae**

Subtribe **Herminiinae**

1. ***Peristylus affinis*** (D. Don) Seidenf. [terrestrial]

Habenaria affinis D. Don

P. Kumar 031079 & 041153

2. ***Peristylus constrictus*** (Lindl.) Lindl. [terrestrial]

Herminium constrictum Lindl.

P. Kumar 021097 & 051037

3. ***Peristylus goodyeroides*** (D. Don) Lindl. [terrestrial]

Habenaria goodyeroides D. Don

P. Kumar 031078 & 041152

4. ***Peristylus lawii*** Wight [terrestrial]

P. Kumar 031080 & 041151

Subtribe **Platantherinae**

5. ***Pecteilis triflora*** (D. Don) T. Tang & F. T. Wang [terrestrial]

Habenaria triflora D. Don

P. Kumar 051062 & 051086

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Subtribe **Habenariinae**

- 6. *Habenaria commelinifolia*** (Roxb.) Wall. ex Lindl. [terrestrial]
Orchis commelinifolia Roxb.
P. Kumar 041135 & 051042
- 7. *Habenaria digitata*** Lindl. [terrestrial]
P. Kumar 041167
- 8. *Habenaria diphylla*** (Nimmo) Dalzell [terrestrial]
Liparis diphyllus Nimmo
P. Kumar 041203 & 051117
- 9. *Habenaria furcifera*** Lindl. [terrestrial]
P. Kumar 031075 & 051094
- 10. *Habenaria gibsoni*** Hook. f. var. *foetida* Blatt. & McCann [terrestrial]
P. Kumar 041178 & 051018
- 11. *Habenaria longicorniculata*** J.Graham [terrestrial]
P. Kumar 041165 & 051021
- 12. *Habenaria marginata*** Colebr. [terrestrial]
P. Kumar 041105 & 051036
- 13. *Habenaria pelorioides*** Par. & Rchb. f. [terrestrial]
P. Kumar (021066 & 021078)
- 14. *Habenaria reniformis*** (D. Don) Hook. f. [terrestrial]
Listera reniformis D. Don
P. Kumar 041205 & 051027
- 15. *Plantaginorchis plantaginea*** (Lindl.) Szlach. [lithophytic and terrestrial]
Habenaria plantaginea Lindl.
P. Kumar 041099 & 051093

Subfamily **Spiranthoideae**

Tribe **Goodyereae**

Subtribe **Cheirostylidinae**

- 16. *Zeuxine strateumatica*** (L.) Schltr. [semi-aquatic]
Orchis strateumatica L.
P. Kumar 031001.

Subfamily **Vanilloideae**

Tribe **Nervilieae**

Subtribe **Nervilinae**

- 17. *Nervilia aragoana*** Gaudich. [terrestrial]
P. Kumar 041157 & 041164
- 18. *Nervilia biflora*** (Wight) Schltr. [terrestrial]
Pogonia biflora Wight
P. Kumar 041204
- 19. *Nervilia crociformis*** (Zoll. & Mor.) Seidenf. [terrestrial]
Bolborchis crociformis Zoll. & Moritz
P. Kumar 041189
- 20. *Nervilia falcata*** (King & Pantl.) Schltr. [terrestrial]
Pogonia falcata King & Pantl.
P. Kumar 031041 & 051115
- 21. *Nervilia infundibulifolia*** Blatt. & McCann. [terrestrial]
P. Kumar 041125
- 22. *Nervilia macroglossa*** (Hook. f.) Schltr. [terrestrial]
Pogonia macroglossa Hook. f.
P. Kumar 051114
- 23. *Nervilia prainiana*** (King & Pantl.) Seidenf. [terrestrial]
Pogonia prainiana King & Pantl.
P. Kumar 021058 & 051067

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Subfamily **Epidendroideae**

Tribe **Malaxideae**

Subtribe **Malaxidinae**

24. *Malaxis mackinnonii* (Duthie) Ames [terrestrial]

Microstylis mackinnonii Duthie

P. Kumar 041162 & 051087

25. *Malaxis purpurea* (Lindl.) Kuntze [terrestrial]

Microstylis purpurea Lindl.

P. Kumar 051088

26. *Liparis paradoxa* (Lindl.) Rchb. f. [terrestrial]

Empusa paradoxa Lindl.

P. Kumar 051118

Subtribe **Oberoniinae**

27. *Oberonia falconeri* Hook. f. [epiphytic]

P. Kumar 021042 & 051069

Tribe **Coelogyneae**

Subtribe **Coleogyniinae**

28. *Pholidota imbricata* Lindl. [lithophytic]

P. Kumar 031018 & 051077

29. *Pholidota pallida* Lindl. [lithophytic]

P. Kumar 041207

Tribe **Dendrobieae**

Subtribe **Dendrobiinae**

30. *Dendrobium aphyllum* (Roxb.) C. E. C. Fisch. [epiphytic]

Limodorum aphyllum Roxb.

P. Kumar 021092 & 031004

31. *Dendrobium bicameratum* Lindl. [epiphytic]

K. Biswas 2180

32. *Dendrobium crepidatum* Lindl. & Paxton [epiphytic]

P. Kumar 021074 & 051045

33. *Dendrobium fimbriatum* Hook. [epiphytic]

P. Kumar 051085

34. *Dendrobium formosum* Roxb. ex Lindl. [Epiphytic]

P. Kumar 051048 & 051082

35. *Dendrobium herbaceum* Lindl. [epiphytic]

P. Kumar 021071 & 041081

36. *Dendrobium macrostachyum* Lindl. [epiphytic]

P. Kumar 031035 & 051078

37. *Dendrobium moschatum* (Buch.-Ham.) Sw. [lithophyte]

Epidendrum moschatum Buch.-Ham.

P. Kumar 041192 & 051044

38. *Dendrobium peguanum* Lindl. [epiphytic]

P. Kumar 021045 & 041068

39. *Dendrobium regium* Prain [epiphytic]

L. Cardon s.n. (CAL 451398 & 451396)

40. *Dendrobium transparens* Lindl. [epiphytic]

P. Kumar 021072 & 031015

Subtribe **Bulbiphyllinae**

41. *Bulbophyllum crassipes* Hook. f. [epiphytic]

P. Kumar 041008 & 051064

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Subtribe **Cymbidinae**

- 42. *Cymbidium aloifolium*** (L.) Sw. [epiphytic]
Epidendrum aloifolium L.
P. Kumar 051060
- 43. *Cymbidium macrorhizon*** Lindl. [terrestrial]
P. Kumar 021063 & 041190
- 44. *Eulophia explanata*** Lindl. [terrestrial]
P. Kumar 021003 & 041034
- 45. *Eulophia graminea*** Lindl. [terrestrial]
P. Kumar 041111
- 46. *Eulophia spectabilis*** (Dennst.) C. R. Suresh [terrestrial]
Wolfia spectabilis Dennst.
P. Kumar 021037 & 051058
- 47. *Geodorum densiflorum*** (Lam.) Schltr. [terrestrial]
Limodorum densiflorum Lam.
P. Kumar 031046 & 041067
- 48. *Geodorum laxiflorum*** Griff. [terrestrial]
P. Kumar 041126 & 051016
- 49. *Geodorum recurvum*** (Roxb.) Alston [terrestrial]
Limodorum recurvum Roxb.
P. Kumar 031072 & 051028

Tribe **Vandaeae**

Subtribe **Vandiinae**

- 50. *Vanda tessellata*** (Roxb.) Hook. ex G. Don [epiphytic]
Epidendrum tessellatum Roxb.
P. Kumar 031055 & 051001
- 51. *Vanda testacea*** (Lindl.) Rchb. f. [epiphytic]
Aerides testaceum Lindl.
P. Kumar 021090 & 051123
- 52. *Luisia brachystachys*** (Lindl.) Blume [epiphytic]
Mesoclastes brachystachys Lindl.
P. Kumar 021048
- 53. *Luisia trichorrhiza*** (Hook.) Blume [epiphytic]
Vanda trichorrhiza Hook.
P. Kumar 031021 & 051063
- 54. *Luisia zeylanica*** Lindl. [epiphytic]
P. Kumar 031017 & 041127

Subtribe **Gastrochilinae**

- 55. *Smitinandia micrantha*** (Lindl.) Holttum [epiphytic]
Saccolabium micranthum Lindl.
P. Kumar 051066 & 051084
- 56. *Acampe papillosa*** (Lindl.) Lindl. [epiphytic]
Saccolabium papillosum Lindl.
P. Kumar 051061
- 57. *Acampe praemorsa*** (Roxb.) Blatt. & McCann [epiphytic]
Epidendrum praemorsum Roxb.
P. Kumar 021041 & 041014
- 58. *Acampe rigida*** (Buch.-Ham ex Sm.) P. F. Hunt [epiphytic]
Aerides rigida Buch.-Ham. ex Sm.
P. Kumar 051068
- 59. *Luisiopsis inconspicua*** (Hook. f.) Sathish & Suresh [epiphytic]
Saccolabium inconspicuum Hook.f.
P. Kumar 021070 & 041043

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Subtribe **Aeridinae**

- 60. *Aerides multiflora*** Roxb. [epiphytic]
P. Kumar 031007 & 051126
61. *Aerides odorata* Lour. [epiphytic]
P. Kumar 021031 & 031058
62. *Rhynchostylis retusa* (L.) Blume [epiphytic]
Epidendrum retusum L.
P. Kumar 021047 & 051129

Subtribe **Pelatantheriinae**

- 63. *Pelatantheria insectifera*** (Rchb. f.) Ridl. [epiphytic]
Sarcanthus insectifer Rchb. f.
P. Kumar 031013 & 051053

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